embodiment or preferred embodiment of the invention contemplates comprehensive tactile-based computing which is appropriate for vision impaired users. The tactile-based computing system may take advantage of standard Braille or standard English ASCII characters and other shapes and forms which are and have become critical to icon-based computing. A vision-impaired user now may take advantage of the technology such as speech to text, text to speech, Braille keyboards and/or other forms of technology which allows for computing. However, the existing technology is not sufficient: the new invention allows for a vision impaired user to be able to not only make the commands such as voice but also be able to manipulate the icons, text and other computer display components in the same way that a person using a mouse could do.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG. **1** is a diagram of the prior art LCD touch screen;

[0018] FIG. **2** is a simplified "layer" function diagram of a first embodiment of the present invention;

[0019] FIG. **3** is a further detailed function diagram of a first embodiment of the present invention;

[0020] FIGS. **4**A and B show an embodiment of the invention that uses micro-channels and an upper layer of "periodic" flex material allowing for raised and lowered areas;

[0021] FIG. **5** shows a function diagram of the electrical current moving the electroheleological fluid to expand the tactile screen;

[0022] FIG. **6** shows the implementation in 2 dimensions;

[0023] FIG. **7** shows the desired optical manipulation embodiment which may be implemented in conjunction with the tactile-based system or by itself;

[0024] FIG. **8** shows an optical distortion and a concave feature in an alternate embodiment.

[0025] FIG. **9** shows a sample one dimensional configuration of the tactile screen;

[0026] FIG. **10** shows a Braille configuration of the screen in one dimension;

[0027] FIG. **11** shows a multiphase embodiment with both raised and lowered portion of the tactile screen.

[0028] FIG. **12** shows that an expanding fluidic material is placed in between the screen cover layer and the LCD screen. The electrically active portion may be optionally activated in the same manner as a touchscreen by placing the electrically sensitive layer above the expanding fluidic material.

[0029] FIG. **13** shows that an electrical signal is driven to a point below the expanding material, in response the electrical material expands and creates a rise point or section in the cover layer.

[0030] FIG. **14**A shows the functional diagram of an embodiment in which the tactile section or set of tactile pixels (or TIXEL™ or PICTLE™) is activated at a first point and first time;

[0031] FIG. **14**B illustrates a second tactile pixel area being activated;

[0032] FIGS. **7** and **8** show the optical applications of the present invention in which the "image" is distorted in desired manner applied by the expansion or contraction of the tactile portion of the screen. FIG. **8** also shows the advantage of a concave section (also shown in FIG. **11**) of the tactile reconfiguration.

[0033] FIG. **9** shows a touch screen in which the tactile portion is also responsive and reconfigured to the touch screen input.

[0034] FIG. **10** shows a Braille version of the present invention in which the tactile screen is fully interactive with the finger(s) of the user much in the same manner that a "mouse" or table pen would be available to select menu options and links.

[0035] FIG. **15** illustrates a sample tactile-based computing screen and representational functional areas;

[0036] FIG. **16** shows a contiguous tactile "font" or a first tactile font type;

[0037] FIG. **17** shows a second tactile font type;

[0038] FIG. **18** illustrates a sample functional tactile display screen system and the control areas for "tap-and-drop" tactile computing;

[0039] FIG. **19** shows a dual function screen in which alpha-numeric and Braille tactile fonts are displayed simultaneously;

[0040] FIG. **20** illustrates a sample control activation for various tactile font patterns;

[0041] FIG. **21** shows a first embodiment of a tap-and-drop tactile computing system;

[0042] FIG. **22** shows the first embodiment in FIG. **21** being activated with a sample shape;

[0043] FIG. **23** illustrates a sample control region for tactile-display based computing;

[0044] FIG. **24** illustrates another application of the invention in which display areas are reconfigured in a limited tactile-display application;

[0045] FIG. **25** illustrates a side view and the advantages of a reconfigurable tactile-enhanced control touch panel;

[0046] FIGS. **26**A and B show a reconfigured tactile-enhanced touch panel from top and side views.

DETAILED DESCRIPTION

[0047] If we refer to FIG. **1**, we can understand a very basic concept of the prior art touch screen system, in which a cover layer allows the signals to be processed through touch in order to pass through the electrical layer. The display layer may or may not have any connections to the electrical layer. But, for example, where the finger is touching the cover layer, the electrical layer is responding and may signal the computer to display the appropriate icon or location of this cursor. Of course, the screen layer diagram is a highly simplified version of the many types of prior art and touch screens which can be based on touch, digitizer,